THIS REPORT HAS BEEN DELIM.TED
AND CLEARED FOR PUBLIC RELEASE
UNDER DOD DIRECTIVE 5200.20 AND
NO RESTRICTIONS ARE IMPOSED UPON
ITS USE AND DISCLOSURE.

DISTRIBUTION STATEMENT A

APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION UNLIMITED.

[redacted]

CONFIDENTIAL
SECURITY INFORMATION

UNCLASSIFIED

AD499516

AD499516

UNANNOUNCED

C8355

C8355

U S NAVAL PROVING GROUND
DAHLGREN, VIRGINIA

REPORT NO 982

TEST AND DEVELOPMENT OF
MOLYBDENUM GUN LINERS

21st Partial Report

INSPECTION, PROOF AND FIRING TESTS OF
40MM GUN BARREL TYPE A MOD 14 SERIAL NO 17
(MOLYBDENUM LINER - WESTINGHOUSE NO BL 338)

FINAL Report

Task Assignment NPG-13-Re5a-27-1-52

Copy No. 6

Classification [redacted]

NAVY DEPT.

1952 JUN 9 13 55

BUORD
RECEIVED

LIBRARY OF CONGRESS
REFERENCE DEPARTMENT
TECHNICAL INFORMATION DIVISION
FORMERLY
NAVY RESEARCH SECTION

RETURN TO:
ASTIA REFERENCE CENTER
LIBRARY OF CONGRESS
WASHINGTON 25, D.C.

AUG 29 19[redacted]

UNCLASSIFIED

CONFIDENTIAL
SECURITY INFORMATION

Best
Available
Copy

[redacted]

NPG REPORT NO. 982

U. S. NAVAL PROVING GROUND
DAHLGREN, VIRGINIA

LIBRARY OF CONGRESS
REFERENCE DEPARTMENT
TECHNICAL INFORMATION DIVISION
FORMERLY
(NAVY RESEARCH SECTION)

AUG 29 1952

Twenty-First Partial Report

on

Test and Development of

Molybdenum Gun Liners

Final Report

on

Inspection, Proof and Firing Tests of

40mm Gun Barrel Type A Mod. 14 Serial No. 17

(Molybdenum Liner - Westinghouse No. EL 338)

Project No.: NPG-13-Re5a-27-1-52 Date: JUN 6 1952
Copy No.: 6
No. of Pages: 7

[redacted]

STAR GAUGE DATA

[redacted]

Stargauge (A)

LANDS

[illegible]		Type - A		14		17		ORIGIN OF BORE 12.[illegible]	
DISTANCE	READING	DISTANCE	READING	DISTANCE	READING	DISTANCE	READING	DISTANCE	READING
11.25	1.660	[illegible]	1.577	[illegible]	1.625	41.0	1.620	85.0	.618
12.0	.640	42.0	.577	12.0	.638	42.0	.620	87.0	.617
12.25	.639	44.0	.577	12.25	.637	44.0	.619	87.5	.613
12.40	.638-	46.0	.576	12.40	.636	46.0	.620	88.0	.614
12.60	.619	48.0	.576	12.60	.623	48.0	.620	88.5	.614
12.732	.603	50.0	.577	12.732	.623	50.0	.620		
12.75	.602	51.0	.578	12.75	.624	51.0	.619	M	1.572
13.0	1.596	52.0	.578	13.0	.624	52.0	.620	87.5	.572
13.75	.581	54.0	.578	13.75	.619	54.0	.620	75.5	.576
14.0	.579	56.0	.577	14.0	.619	56.0	.620	24.75	.576
15.0	.580	58.0	.577	15.0	.619	58.0	.618	13.75	.583
16.0	.578	60.0	.577	16.0	.618	60.0	.620	12.75	1.603
17.0	.579	61.0	.576	17.0	.618	61.0	.620		
18.0	.577	62.0	.576	18.0	.616	62.0	.620		
20.0	.576	64.0	.578	20.0	.619	64.0	.620	Plug Gage	
21.0	.575	66.0	.578	21.0	.615	66.0	.620	12.613	
22.0	.575	68.0	.577	22.0	.615	68.0	.619		
24.0	.575	70.0	.577	24.0	.616	70.0	.619	Star Gage Zero	
24.75	.575	71.0	.577	24.75	.616	71.0	.619	Lands	1.575
26.0	.575	72.0	.578	26.0	.617	72.0	.616	Grooves	1.618
28.0	.575	74.0	.576	28.0	.616	74.0	.618		
30.0	.575	75.5	.575	30.0	.618	75.5	.619		
31.0	.575	76.0	.575	31.0	.616	76.0	.617		
32.0	.575	78.0	.577	32.0	.618	78.0	.618		
33.0	.575	80.0	.575	33.0	.618	80.0	.618		
34.0	.576	81.0	.574	34.0	.622	81.0	.619		
35.0	.577	82.0	.575	35.0	.621	82.0	.619		
36.0	.576	83.0	.575	36.0	.619	83.0	.616		
36.5	.576	84.0	.575	36.5	.617	84.0	.617		
36.75	.575	85.0	.576	36.75	.612				
37.0	.576	87.0	.575	37.0	.616				
37.5	.575	87.5	.575	37.5	.620				
38.0	.575	88.0	.572	38.0	.620				
40.0	.575	88.5	.572	40.0	.620				

EQ SER ROUNDS 1388

DATE 4-3-51

SMALL DIAMETER 1.572

DISTANCE 88.000

GAUGED BY C. K. S.

PRDC-9-12-49-3M

[redacted] Table I Appendix A

PRE

STAR GAUGE DATA
PRNC-RrG-108

CONFIDENTIAL

All measurements taken from breech face Gun Cold Stargauge (A)

LANDS GROOVES

40MM	"	CAL MK Type A		MOD 14		GUN NO 17		ORIGIN OF BORE 12.775	
DISTANCE	READING	DISTANCE	READING	DISTANCE	READING	DISTANCE	READING	DISTANCE	READING
11.25	1.659	41.0	1.578	11.25	1.654	41.0	1.622	88.0	1.622
12.0	.641	42.0	.577	12.0	.640	42.0	.623	87.0	.622
12.25	.640	44.0	.576	12.25	.640	44.0	.623	87.5	.622
12.40	.639	46.0	.578	12.40	.642	46.0	.624	88.0	.621
12.60	.619	48.0	.578	12.60	.628	48.0	.624	88.5	.621
12.732	.606	50.0	.580	12.732	.624	48.0	.624		
12.75	.604	51.0	.580	12.75	.624	51.0	.624		
13.0	.600	52.0	.581	13.0	.629	52.0	.623		
13.75	1.586	54.0	.581	13.75	.626	54.0	.623	M	1.577
14.0	.582	56.0	.580	14.0	.623	56.0	.623	87.5	1.577
15.0	.581	58.0	.578	15.0	.622	58.0	.621	75.5	1.578
16.0	.580	60.0	.578	16.0	.624	60.0	.623	24.75	1.575
17.0	.581	61.0	.578	17.0	.624	61.0	.623	13.75	1.585
18.0	.578	62.0	.579	18.0	.620	62.0	.623	12.75	1.606
20.0	.576	64.0	.579	20.0	.619	64.0	.622		
21.0	.575	66.0	.580	21.0	.618	66.0	.623	Plug Gage	
22.0	.575	68.0	.580	22.0	.618	68.0	.623	12.623	
24.0	.576	70.0	.579	24.0	.621	70.0	.622		
24.75	.575	71.0	.579	24.75	.622	71.0	.623		
26.0	.575	72.0	.578	26.0	.619	72.0	.623	Star Gage Zero	
28.0	.576	74.0	.578	28.0	.621	74.0	.622	Lands	1.575
30.0	.575	75.5	.579	30.0	.618	75.5	.622	Grooves	1.618
31.0	.575	76.0	.578	31.0	.619	76.0	.621		
32.0	.575	78.0	.580	32.0	.619	78.0	.622		
33.0	.575	80.0	.579	33.0	.620	80.0	.622		
34.0	.576	81.0	.578	34.0	.624	81.0	.622		
35.0	.576	82.0	.578	35.0	.622	82.0	.622		
36.0	.575	83.0	.578	36.0	.622	83.0	.622		
36.5	.575	84.0	.578	36.5	.620	84.0	.622		
36.75	.575	85.0	.578	36.75	.614	By Gun Number		1748	
37.0	.582	87.0	.577	37.0	.622	DATE		4-4-51	
37.5	.580	87.5	.577	37.5	.623	SMALL DIAMETER		1.575	
39.0	.582	85.0	.575	39.0	.624	DISTANCE		21.000	
40.0	.580	88.5	.576	40.0	.624	GAUGED BY		C. K. S.	

CONFIDENTIAL
Security Information

PRNC-9-12-40-3M

Table II Appendix A

STAR GAUGE DATA
PRRC-BPG-108

CONFIDENTIAL

All measurements taken from breech face. Gun Cold. Stargauge (A)

LANDS		GROOVES							
40MM " /		CAL. ER Type A		MOD. 1¼		GUN NO. 17		ORIGIN OF BORE 12.75	
DISTANCE	READING	DISTANCE	READING	DISTANCE	READING	DISTANCE	READING	DISTANCE	READING
11.25	1.659	41.0	1.582	11.25	1.654	41.0	1.621	85.0	1.619
12.0	.641	42.0	.581	12.0	.638	42.0	.621	87.0	.618
12.25	.641	44.0	.581	12.25	.641	44.0	.621	87.5	.618
12.40	.640	46.0	.582	12.40	.640	46.0	.622	88.0	.618
12.60	.624	48.0	.583	12.60	.624	48.0	.622	88.5	.618
12.732	.610	50.0	.585	12.732	.623	50.0	.622		
12.75	.609	51.0	.586	12.75	.623	51.0	.622		
13.0	.604	52.0	.587	13.0	.629	52.0	.622	M	1.580
13.75	1.588	54.0	.586	13.75	.620	54.0	.621	87.5	1.580
14.0	.584	56.0	.585	14.0	.621	56.0	.621	75.5	1.580
15.0	.583	58.0	.583	15.0	.624	58.0	.620	24.75	1.576
16.0	.583	60.0	.580	16.0	.619	60.0	.620	13.75	1.589
17.0	.585	61.0	.580	17.0	.620	61.0	.620	12.75	1.610
18.0	.580	62.0	.581	18.0	.617	62.0	.620		
20.0	.577	64.0	.581	20.0	.617	64.0	.620		
21.0	.576	66.0	.582	21.0	.613	66.0	.619		
22.0	.576	68.0	.582	22.0	.614	68.0	.619	Plug Gage	
24.0	.576	70.0	.581	24.0	.616	70.0	.619	12.648	
24.75	.576	71.0	.580	24.75	.617	71.0	.619		
26.0	.575	72.0	.580	26.0	.612	72.0	.618		
28.0	.577	74.0	.580	28.0	.618	74.0	.619	Star Gage Zero	
30.0	.577	75.5	.581	30.0	.615	75.5	.619	Lands	1.575
31.0	.577	76.0	.580	31.0	.617	76.0	.619	Grooves	1.618
32.0	.575	78.0	.582	32.0	.614	78.0	.619		
33.0	.575	80.0	.582	33.0	.610	80.0	.619		
34.0	.577	81.0	.582	34.0	.619	81.0	.619		
35.0	.577	82.0	.581	35.0	.618	82.0	.619		
36.5	.576	83.0	.580	36.5	.616	83.0	.619		
36.75	.575	84.0	.579	36.75	.610	84.0	.619		
37.0	.590	85.0	.580	37.0	.621	FC SER. ROUNDS		21 05	
37.5	.586	87.0	.580	37.5	.621	DATE		4-5-51	
38.0	.587	87.5	.580	38.0	.621	SMALL DIAMETER		1.575	
39.0	.588	83.0	.580	39.0	.622	DISTANCE		26.000	
40.0	.586	88.5	.580	40.0	.622	GAUGED BY		C. K. S.	

CONFIDENTIAL
Security Information

Table III

Appendix A

PRRC-P-12-50-2M

STAR GAUGE DATA
PRNC-BPG-108

CONFIDENTIAL

All measurements taken from breech face Gun Cold Stargauge (A)

LANDS		CAL .40		MOD.		GUN NO		ORIGIN OF BORE	
40mm		Type - A		14		17		12.775	
				GROOVES					
DISTANCE	READING	DISTANCE	READING	DISTANCE	READING	DISTANCE	READING	DISTANCE	READING
11.25	1.657	41.0	1.576	11.25	1.665	41.0	1.620	85.0	1.621
12.0	.641	42.0	.576	12.0	.641	42.0	.619	87.0	.621
12.25	.647	44.0	.578	12.25	.644	44.0	.620	87.5	.621
12.40	.642	46.0	.577	12.40	.643	46.0	.620	88.0	.622
12.60	.627	48.0	.578	12.60	.629	48.0	.620	88.5	.621
12.732	.617	50.0	.577	12.732	.629	50.0	.620		
12.75	.611	51.0	.578	12.75	.630	51.0	.620		
13.0	.607	52.0	.578	13.0	.638	52.0	.620		
13.75	1.590	54.0	.578	13.75	.631	54.0	.620		
14.0	.585	56.0	.578	14.0	.628	66.0	.620		
15.0	.585	58.0	.577	15.0	.628	58.0	.618		
16.0	.584	60.0	.577	16.0	.627	60.0	.620		
17.0	.588	61.0	.576	17.0	.628	61.0	.620	M	1.576
18.0	.580	62.0	.577	18.0	.621	62.0	.620	87.5	1.575
20.0	.578	64.0	.577	20.0	.621	64.0	.620	75.5	.577
21.0	.577	66.0	.578	21.0	.618	66.0	.620	24.75	.577
22.0	.577	68.0	.578	22.0	.621	68.0	.619	13.75	.591
24.0	.577	70.0	.578	24.0	.622	70.0	.619	12.75	1.612
24.75	.577	71.0	.576	24.75	.622	71.0	.618		
26.0	.577	72.0	.577	26.0	.613	72.0	.618		
28.0	.577	74.0	.577	28.0	.618	74.0	.620		
30.0	.576	75.5	.577	30.0	.618	75.5	.619		
31.0	.576	76.0	.577	31.0	.618	76.0	.620		
32.0	.575	78.0	.577	32.0	.618	78.0	.620	Plug Gage	
33.0	.576	80.0	.576	33.0	.618	80.0	.620	12.685	
34.0	.577	81.0	.575	34.0	.621	81.0	.621		
35.0	.577	82.0	.576	35.0	.621	82.0	.621		
36.5	.577	83.0	.576	36.5	.618	83.0	.620		
36.75	.577	84.0	.576	36.75	.613	84.0	.620		
37.0	.577	85.0	.577	37.0	.619				
37.5	.577	87.0	.576	37.5	.619				
38.0	.576	87.5	.576	38.0	.619				
39.0	.575	88.0	.575	39.0	.619				
40.0	.575	88.5	.575	40.0	.620				

FG. GEN. NO. NOS. 2458

DATE 6-7-51

SMALL DIAMETER 1.575

DISTANCE 32.000

GAUGED BY C. K. S.

PRNC-9-12-50-3M

CONFIDENTIAL
Security Information

Table IV

Appendix A

STAR GAUGE DATA
PROC-RPG-108

CONFIDENTIAL

All measurements taken from breech face Gun Cold Stargauge (A)

LANDS 1.575 GROOVES 1.618

40MM "	CAL. MK Type A		MOD 14		GUN NO 17		ORIGIN OF BORE 12.75	
DISTANCE	READING	DISTANCE	READING	DISTANCE	READING	DISTANCE	READING	DISTANCE	READING
11.25	1.658	41.0	1.579	11.25	1.643	41.0	1.621	85.0	1.621
12.0	.640	42.0	.578	12.0	.639	42.0	.623	87.0	.621
12.25	.645	44.0	.579	12.25	.646	44.0	.622	87.5	.621
12.40	.644	46.0	.579	12.40	.638	46.0	.622	88.0	.621
12.60	.627	48.0	.579	12.60	.632	48.0	.622	88.5	.620
12.732	.617	50.0	.580	12.732	.633	50.0	.622		
12.75	.614	51.0	.580	12.75	.635	51.0	.622		
13.0	.610	52.0	.581	13.0	.645	52.0	.621		
13.75	1.594	54.0	.580	13.75	.636	54.0	.620		
14.0	.589	56.0	.580	14.0	.635	56.0	.621	M	1.581
15.0	.588	58.0	.580	15.0	.628	58.0	.621	87.5	.580
16.0	.586	60.0	.579	16.0	.619	60.0	.621	75.5	.580
17.0	.592	61.0	.580	17.0	.627	61.0	.621	24.75	.579
18.0	.581	62.0	.580	18.0	.616	62.0	.621	13.75	.598
20.0	.580	64.0	.580	20.0	.615	64.0	.620	12.75	1.616
21.0	.579	66.0	.580	21.0	.612	66.0	.620		
22.0	.578	68.0	.580	22.0	.611	68.0	.621		
24.0	.577	70.0	.581	24.0	.620	70.0	.620		
24.75	.578	71.0	.581	24.75	.623	71.0	.619		
26.0	.578	72.0	.581	26.0	.618	72.0	.618		
28.0	.578	74.0	.580	28.0	.621	74.0	.618	Plug Gage	
30.0	.578	75.5	.580	30.0	.619	75.5	.618	12.725	
31.0	.578	76.0	.580	31.0	.620	76.0	.618		
32.0	.576	78.0	.581	32.0	.618	78.0	.619		
33.0	.576	80.0	.581	33.0	.618	80.0	.619		
34.0	.577	81.0	.580	34.0	.622	81.0	.619		
35.0	.578	82.0	.579	35.0	.621	82.0	.619		
36.0	.578	83.0	.579	36.0	.618	83.0	.620		
36.5	.578	84.0	.580	36.5	.618	84.0	.620		
36.75	.577	85.0	.581	36.75	.613				
37.0	.579	87.0	.581	37.0	.621				
37.5	.580	87.5	.580	37.5	.622				
39.0	.579	88.0	.579	39.0	.621				
40.0	.580	88.5	.580	40.0	.622				

CO. FOR BOARDS 2804

DATE 6 - 8 - 51

SMALL DIAMETER 1.576

DISTANCE 32.000

GAUGED BY C. K. S.

PROC-8-10-00-00

CONFIDENTIAL
Security Information

Table V

Appendix A

Inspection, Proof and Firing Tests of
40mm Gun Barrel Type A Mod. 14 Serial No. 17
(Molybdenum Liner - Westinghouse No. BL 338)

TABLE VI

40MM GUN TYPE A MOD. 14 NO. 17 (BL 338)
TABULATION OF VELOCITY AND PRESSURE DATA

Rd. No.	Velocity f/s	Pressure Tons/in^2	Remarks
1038	-	-	Warming Rd.
1039	2829	-	Warming Rd.
1040	3075	25.2	Proof Rd.
1041	3085	24.2	Proof Rd.
1042	2846	-	Relieving Rd.

STANDARD FIRING SERIES NO. 7
Cold Erosion Check

Rd. No.	Velocity f/s	Pressure Tons/in^2
1043	2969	-
1044	2847	18.9
1045	2839	18.6
1046	2831	18.2
1047	2823	17.7
1048	2831	18.4
1049	2843	18.6
1050	2833	18.6
1051	2829	17.7
1052	2809	17.1
1053	2823	17.5

STANDARD FIRING SERIES NO. 8
Cold Erosion Check

Rd. No.	Velocity f/s	Pressure Tons/in^2
1216	2817	-
1217	2800	17.3
1218	2833	18.2
1219	2837	18.0
1220	2821	17.7
1221	2819	18.2
1222	2831	18.4
1223	2813	18.0
1224	2819	18.0
1225	2803	17.3
1226	2807	18.0

Burst Firing, Nineteen 8-rd. Bursts Velocities first four rounds each burst

Burst Number	Round No. 1	Round No. 2	Round No. 3	Round No. 4
115	2967	2965	2969	3025
116	2967	2976	3005	2956
117	2967	2955	2947	2949
118	2970	2938	2927	2932
119	2949	2940	2970	2969
120	2919	2927	2925	2927
121	2934	2927	2925	2923
122	2932	2929	2919	-
123	2929	2919	2942	2944
124	2932	2927	2929	2938
125	2910	2938	2892	2913
126	2938	2913	2908	2938
127	2932	2942	2873	2895
128	2947	2938	2942	2940
129	2942	2929	2927	2960
130	2886	2913	2906	2925
131	2898	2930	2919	2934
132	2925	-	2917	2886
133	2890	2900	2913	2906

Burst Firing, Nineteen 8-rd. Bursts Velocities first four rounds each burst

Burst Number	Round No. 1	Round No. 2	Round No. 3	Round No. 4
134	2953	2947	2953	2970
135	2981	2970	2955	2975
136	2979	2992	2984	2951
137	2953	2953	2968	2962
138	2940	2940	2919	2957
139	2938	2951	2927	2910
140	2929	2921	2929	2951
141	2923	2940	2942	2906
142	2940	2936	2940	2944
143	2937	2935	2948	2913
144	2924	2939	2920	2948
145	2869	2958	2937	2941
146	2877	2933	2908	2906
147	2900	2920	2898	2945
148	2904	2898	2919	2927
149	2888	2929	2904	2998
150	2904	-	2902	-
151	2892	2877	2890	2906
152	2894	2863	2894	2892

Inspection, Proof and Firing Tests of
40mm Gun Barrel Type A Mod. 14 Serial No. 17
(Molybdenum Liner - Westinghouse No. BL 338)

TABLE VI (Continued)

Hot Erosion Check			Hot Erosion Check		
Rd. No.	Velocity f/s	Pressure Tons/in^2	Rd. No.	Velocity f/s	Pressure Tons/in^2
1206	2796	16.7	1379	2763	15.5
1207	2796	16.9	1380	2776	16.2
1208	2803	16.7	1381	2773	16.2
1209	2790	16.7	1382	2773	15.5
1210	2790	16.2	1383	2775	16.1
1211	2790	16.7	1384	2776	16.7
1212	2792	17.1	1385	2771	15.7
1213	2782	16.9	1386	2788	16.9
1214	2755	16.1	1387	2803	16.7
1215	2763	16.7	1388	2775	15.3

Inspection, Proof and Firing Tests of
40mm Gun Barrel Type A Mod. 14 Serial No. 17
(Molybdenum Liner - Westinghouse No. BL 338)

TABLE VII

40MM GUN TYPE A MOD. 14 NO. 17 (BL 338)
TABULATION OF VELOCITY AND PRESSURE DATA

STANDARD FIRING SERIES NO. 9
Cold Erosion Check

Rd. No.	Velocity f/s	Pressure Tons/in^2
1389	2813	-
1390	2829	18.0
1391	2841	18.4
1392	2829	17.7
1393	2815	17.7
1394	2839	17.5
1395	2807	17.3
1396	2843	16.9
1397	2847	18.4
1398	2831	18.9
1399	-	18.4

STANDARD FIRING SERIES NO. 10
Cold Erosion Check

Rd. No.	Velocity f/s	Pressure Tons/in^2
1576	2792	-
1577	2835	18.0
1578	2801	17.7
1579	2819	18.0
1580	2835	18.2
1581	2829	17.7
1582	2827	16.7
1583	2817	15.9
1584	2823	17.3
1585	1801	17.7
1586	2815	17.7

Burst Firing, Twenty-one 8-rd. Bursts Velocities first four rounds each burst

Burst Number	Round No. 1	Round No. 2	Round No. 3	Round No. 4
153	2947	2951	2942	2984
154	2968	2966	2947	2966
155	2919	2949	2955	-
156	2921	2917	2938	2947
157	2934	2944	2929	2949
158	2923	2919	2921	2925
159	2939	2934	2949	2915
160	2934	2921	2919	2917
161	2890	2910	2936	-
162	2900	2906	2906	2900
163	2932	-	2921	2910
164	2890	2883	2896	2894
165	2896	-	2910	2896
166	2867	2906	2917	2932
167	2921	2896	2921	2917
168	2883	2877	2908	2900
169	2877	2877	2902	2881
170	2879	2904	2902	2908
171	2865	2917	2894	2896
172	2871	2879	2879	2917
173	2875	2877	2888	2894

Burst Firing, Nineteen 8-rd. Bursts Velocities first four rounds each burst

Burst Number	Round No. 1	Round No. 2	Round No. 3	Round No. 4
174	2692	2973	2975	2990
175	2970	-	2953	2953
176	2964	-	-	2975
177	2927	2932	2934	2953
178	2925	2938	2949	2942
179	2898	2949	2947	-
180	2910	2923	2938	-
181	2924	2921	2888	2940
182	2896	-	2921	2898
183	2915	-	2896	2915
184	2910	2908	2921	2915
185	2896	2888	2900	2902
186	2902	2853	2932	2919
187	2898	2923	2911	2934
188	2900	-	2904	2921
189	2917	2908	2930	2906
190	2883	2900	2902	2923
191	2892	2871	2908	2881
192	2875	2900	2867	-

Hot Erosion Check

Rd. No.	Velocity f/s	Pressure Tons/in^2
1566	2790	16.9
1567	2798	16.5
1568	2794	16.7
1569	2790	14.5
1570	2784	16.1
1571	2761	14.1
1572	2681	16.5
1573	2809	16.1
1574	2765	16.1
1575	2757	15.3

Hot Erosion Check

Rd. No.	Velocity f/s	Pressure Tons/in^2
1739	2957	16.1
1740	2730	14.5
1741	2775	13.9
1742	2759	16.1
1743	2778	14.9
1744	2773	16.1
1745	2776	16.2
1746	2769	15.9
1747	2741	16.2
1748	2728	13.5

Inspection, Proof and Firing Tests of
40mm Gun Barrel Type A Mod. 14 Serial No. 17
(Molybdenum Liner - Westinghouse No. BL 338)

TABLE VIII

40MM GUN TYPE A MOD. 14 NO. 17 (BL 338)
TABULATION OF VELOCITY AND PRESSURE DATA

STANDARD FIRING SERIES NO. 11
Cold Erosion Check

Rd. No.	Velocity f/s	Pressure Tons/in^2
1749	2818	-
1750	2818	18.0
1751	2826	18.2
1752	2820	16.7
1753	2830	18.4
1754	2808	16.5
1755	2826	17.7
1756	2824	16.2
1757	2802	16.7
1758	2808	16.7
1759	2802	16.1

Burst Firing, Nineteen 8-rd. Bursts Velocities first four rounds each burst

Burst Number	Round No. 1	Round No. 2	Round No. 3	Round No. 4
193	2946	-	2939	2926
194	2946	2945	2931	2891
195	2914	2883	2903	2926
196	2920	2916	2918	2926
197	2922	2929	2903	2918
198	2910	2903	2897	2916
199	2905	2924	2920	2935
200	2899	2903	2860	2916
201	2887	2883	2903	2916
202	2894	2899	2903	2916
203	2914	2903	2897	2899
204	2883	2926	2901	2899
205	2893	2905	2903	2901
206	2880	-	2897	2895
207	2870	2874	2876	-
208	2883	2907	2893	-
209	2887	2893	2870	2883
210	2872	2895	2885	2874
211	2828	2883	2870	2903

Hot Erosion Check

Rd. No.	Velocity f/s	Pressure Tons/in^2
1912	2747	16.7
1913	2785	16.2
1914	2777	16.7
1915	2802	16.5
1916	2781	16.9
1917	2754	16.2
1918	2766	16.1
1919	2777	17.1
1920	2781	15.1
1921	2760	16.5

STANDARD FIRING SERIES NO. 12
Cold Erosion Check

Rd. No.	Velocity f/s	Pressure Tons/in^2
1922	2826	-
1923	2818	17.3
1924	2885	16.7
1925	2789	13.9
1926	2779	15.7
1927	2793	17.1
1928	2812	18.0
1929	2814	17.7
1930	2812	15.9
1931	2793	17.5
1932	2816	18.2

Burst Firing, Nineteen 8-rd. Bursts Velocities first four rounds each burst

Burst Number	Round No. 1	Round No. 2	Round No. 3	Round No. 4
212	2924	2946	2931	2954
213	2939	2952	2929	2954
214	2939	2916	2924	2931
215	2924	2918	2910	2929
216	2889	2916	2931	2926
217	2897	2918	2916	2903
218	2897	2910	2916	2903
219	2916	2912	2887	2903
220	2905	2910	2885	2907
221	2893	2893	2901	2916
222	2901	2860	2858	2910
223	2905	2905	2912	2893
224	2860	2852	2912	2876
225	2870	2874	2895	2870
226	2870	2874	2903	2903
227	2876	2860	2844	2862
228	2860	2854	2870	2885
229	2822	2870	2874	2862
230	2860	2876	2883	2866

Hot Erosion Check

Rd. No.	Velocity f/s	Pressure Tons/in^2
2085	2728	15.1
2086	2762	16.2
2087	2751	16.1
2088	2773	15.7
2089	2741	14.7
2090	2772	16.2
2091	2741	15.7
2092	2734	15.1
2093	2721	14.1
2094	2741	16.5

Inspection, Proof and Firing Tests of
40mm Gun Barrel Type A Mod. 14 Serial No. 17
(Molybdenum Liner - Westinghouse No. BL 338)

TABLE VIII (Continued)

STANDARD FIRING SERIES NO. 13
Cold Erosion Check

Rd. No.	Velocity f/s	Pressure Tons/in^2
2095	2821	-
2096	2809	17.3
2097	2798	17.7
2098	2780	16.9
2099	2790	15.3
2100	2798	18.2
2101	2821	17.7
2102	2792	18.0
2103	2807	17.3
2104	2769	16.7
2105	2767	16.7

Inspection, Proof and Firing Tests of
40mm Gun Barrel Type A Mod. 14 Serial No. 17
(Molybdenum Liner - Westinghouse No. BL 338)

- -

TABLE IX

40 MM GUN TYPE A MOD. 14 NO. 17 (BL 338)
TABULATION OF VELOCITY AND PRESSURE DATA

Rd. No.	Velocity f/s	Pressure Tons/in^2	Remarks
2106	2849	-	Warming Rd.
2107	3080	25.9	Proof Rd.
2108	3090	25.2	Proof Rd.

STANDARD FIRING SERIES NO. 14
Cold Erosion Check

Rd. No.	Velocity f/s	Pressure Tons/in^2
2109	2825	15.3
2110	2825	16.1
2111	2825	16.1
2112	2827	16.5
2113	2825	16.5
2114	-	18.0
2115	2815	15.9
2116	2819	16.7
2117	2819	17.1
2118	2813	16.7

STANDARD FIRING SERIES NO. 15
Cold Erosion Check

Rd. No.	Velocity f/s	Pressure Tons/in^2
2281	-	-
2282	-	-
2283	-	-
2284	-	-
2285	-	-
2286	3005	-
2287	2798	17.3
2288	2801	17.1
2289	2800	16.9
2290	2833	17.7
2291	2800	17.1
2292	2809	16.9
2293	2800	16.9
2294	2813	17.1
2295	2792	17.1
2296	2805	16.9

Burst Firing, Nineteen 8-rd. Bursts Velocities first four rounds each burst

Burst Number	Round No. 1	Round No. 2	Round No. 3	Round No. 4
230	2744	2767	2778	2790
231	2769	2750	2759	2763
232	2750	2763	2748	2763
233	2741	2722	2756	2752
234	2737	2737	2748	2730
235	2726	2752	2763	2739
236	2726	2737	2737	2726
237	2735	2733	2744	2752
238	2737	2748	2750	2744
239	2726	2733	2744	2752
240	2726	2744	2722	2726
241	2731	2715	2730	2741
242	2731	2730	2730	2741
243	2700	2697	2737	2733
244	2708	2722	2726	2726
245	2715	2719	2719	2748
246	2735	2708	2722	2719
247	2693	2730	2719	2719
248	2697	2700	2690	2708

Burst Firing, Nineteen 8-rd. Bursts Velocities first four rounds each burst

Burst Number	Round No. 1	Round No. 2	Round No. 3	Round No. 4
249	2942	2942	2942	2951
250	-	2929	2936	2957
251	2936	2944	2936	2957
252	2929	2923	2923	2944
253	2940	2929	2919	2949
254	2936	2927	2940	2940
255	2923	2919	2940	2929
256	2915	2917	2940	2910
257	2932	2932	2940	2936
258	2917	2982	3007	2877
259	2940	2915	2919	2929
260	2915	2940	2877	2906
261	2902	2932	2923	2921
262	2898	2898	2894	2923
263	2910	2886	2919	2910
264	2881	2929	2902	2898
265	2919	2890	2873	2894
266	2857	2910	2902	2881
267	2898	2881	2888	2881

Inspection, Proof and Firing Tests of
40mm Gun Barrel Type A Mod. 14 Serial No. 17
(Molybdenum Liner - Westinghouse No. BL 338)

TABLE IX (Continued)

Hot Erosion Check			Hot Erosion Check		
Rd. No.	Velocity f/s	Pressure Tons/in^2	Rd. No.	Velocity f/s	Pressure Tons/in^2
2271	2782	15.7	2449	2748	15.1
2272	2782	14.9	2450	2771	15.7
2273	2798	15.5	2451	2765	14.9
2274	2765	14.7	2452	2759	15.7
2275	2782	15.1	2453	2780	16.7
2276	2752	14.3	2454	2761	15.7
2277	2763	14.7	2455	2776	15.7
2278	2778	15.5	2456	2759	15.9
2279	2756	14.7	2457	2759	15.9
2280	2752	14.5	2458	2759	15.9

Inspection, Proof and Firing Tests of
40mm Gun Barrel Type A Mod. 14 Serial No. 17
(Molybdenum Liner - Westinghouse No. BL 338)

- -

TABLE X

40MM GUN TYPE A MOD. 14 NO. 17 (BL 338)
TABULATION OF VELOCITY AND PRESSURE DATA

STANDARD FIRING SERIES NO. 16
Cold Erosion Check

Rd. No.	Velocity f/s	Pressure Tons/in^2
2459	-	-
2460	2798	15.1
2461	2803	16.9
2462	2805	17.3
2463	2815	17.3
2464	2813	17.1
2465	2819	17.5
2466	2800	17.1
2467	2815	17.5
2468	2809	17.1
2469	2821	17.5

Burst Firing, Nineteen 8-rd. Bursts Velocities first four rounds each burst

Burst Number	Round No. 1	Round No. 2	Round No. 3	Round No. 4
268	2947	2953	2929	2949
269	2936	2949	2942	2944
270	2927	-	2932	2944
271	2929	-	2913	2923
272	2894	2898	2906	2940
273	2894	2902	2925	2919
274	2902	2919	2902	2934
275	2900	2898	2915	2932
276	2900	2902	2906	2915
277	2904	2923	2913	2892
278	2886	2906	2913	2913
279	2894	2898	2806	2906
280	2888	2902	2892	2910
281	2867	2881	2879	2898
282	-	2894	2898	2894
283	2875	2894	2961	2886
284	2894	2806	2877	2904
285	2875	2883	2913	-
286	-	-	-	-

Hot Erosion Check

Rd. No.	Velocity f/s	Pressure Tons/in^2
2622	2763	Lost Gauge
2623	2750	15.9
2624	2778	15.9
2625	2782	15.9
2626	2780	16.5
2627	2952	15.9
2628	2963	16.2
2629	2773	16.5
2630	2786	16.7
2631	2766	16.1

STANDARD FIRING SERIES NO. 17
Cold Erosion Check

Rd. No.	Velocity f/s	Pressure Tons/in^2
2632	2944	-
2633	2805	17.5
2634	2786	16.9
2635	2817	16.5
2636	2817	16.5
2637	2782	16.1
2638	2763	16.9
2639	2809	16.5
2640	2790	16.2
2641	2903	16.7
2642	2790	16.5

Burst Firing, Nineteen 8-rd. Bursts Velocities first four rounds each burst

Burst Number	Round No. 1	Round No. 2	Round No. 3	Round No. 4
287	2955	2938	2929	2940
288	2923	2950	2944	2879
289	2953	2932	2919	2921
290	2915	2940	2927	2919
291	2919	2919	2940	2951
292	2904	2915	2902	2881
293	2884	2913	2910	2939
294	2896	2919	2915	2869
295	2906	2890	2919	2934
296	2865	2898	2902	2915
297	2881	2865	2886	2915
298	2888	2927	2910	2890
299	2881	2886	2899	2877
300	2896	2906	2906	2886
301	2867	2906	2886	-
302	2853	2877	2886	2894
303	2892	2894	2881	2890
304	2919	2886	2861	2881
305	-	2906	2890	2861

Hot Erosion Check

Rd. No.	Velocity f/s	Pressure Tons/in^2
2795	2757	15.7
2796	2756	15.5
2797	2773	15.5
2798	2750	15.1
2799	2775	15.7
2800	2782	15.9
2801	2777	16.1
2802	2761	15.7
2803	2773	14.5
2804	2719	14.3

Inspection, Proof and Firing Tests of
40mm Gun Barrel Type A Mod. 14 Serial No. 17
(Molybdenum Liner - Westinghouse No. BL 338)

TABLE XI

VISUAL BORESCOPE RECORD

Results of Visual Examination of 40mm Molybdenum Gun Barrel Type A Mod. 14 Serial No. 17

Total Rounds	Remarks
Seventh Standard Firing Series, 1388 rounds	Long cracks indicate possible break of material.
Eighth Standard Firing Series, 1748 rounds	No change
Ninth Standard Firing Series, 2094 rounds	Damage progressing, chipping. Sliver of liner missing at about 2nd and 3rd segment joint beyond O of R at 7 o'clock.
Tenth Standard Firing Series, 2105 rounds	Damage progressing. It was visibly noted that the pattern had opened considerably during the final firing series with frequent tipping of the projectiles. The barrel was returned to the Naval Gun Factory for inspection and photographing. Then returned to contractor to be fitted with new muzzle section.
Eleventh Standard Firing Series, 2458 rounds	Pattern temporarily improved, but after four bursts, opened considerably with some projectiles tipping.
Twelfth Standard Firing Series, 2804 rounds	The liner bore surface was a web of cracks with small pieces of liner missing at several places.

NP9-48992 2 April 1951

40MM Gun Barrel, Type A Mod. 14, Serial No. 17, Figure 1 - 11 Rounds Cold Erosion Test, Figure 2 - 19 - 8 Round Bursts, Figure 3 - 10 Rounds Hot Erosion Test, Total No. Rounds on Barrel - 1215

Figures 1, 2 and 3

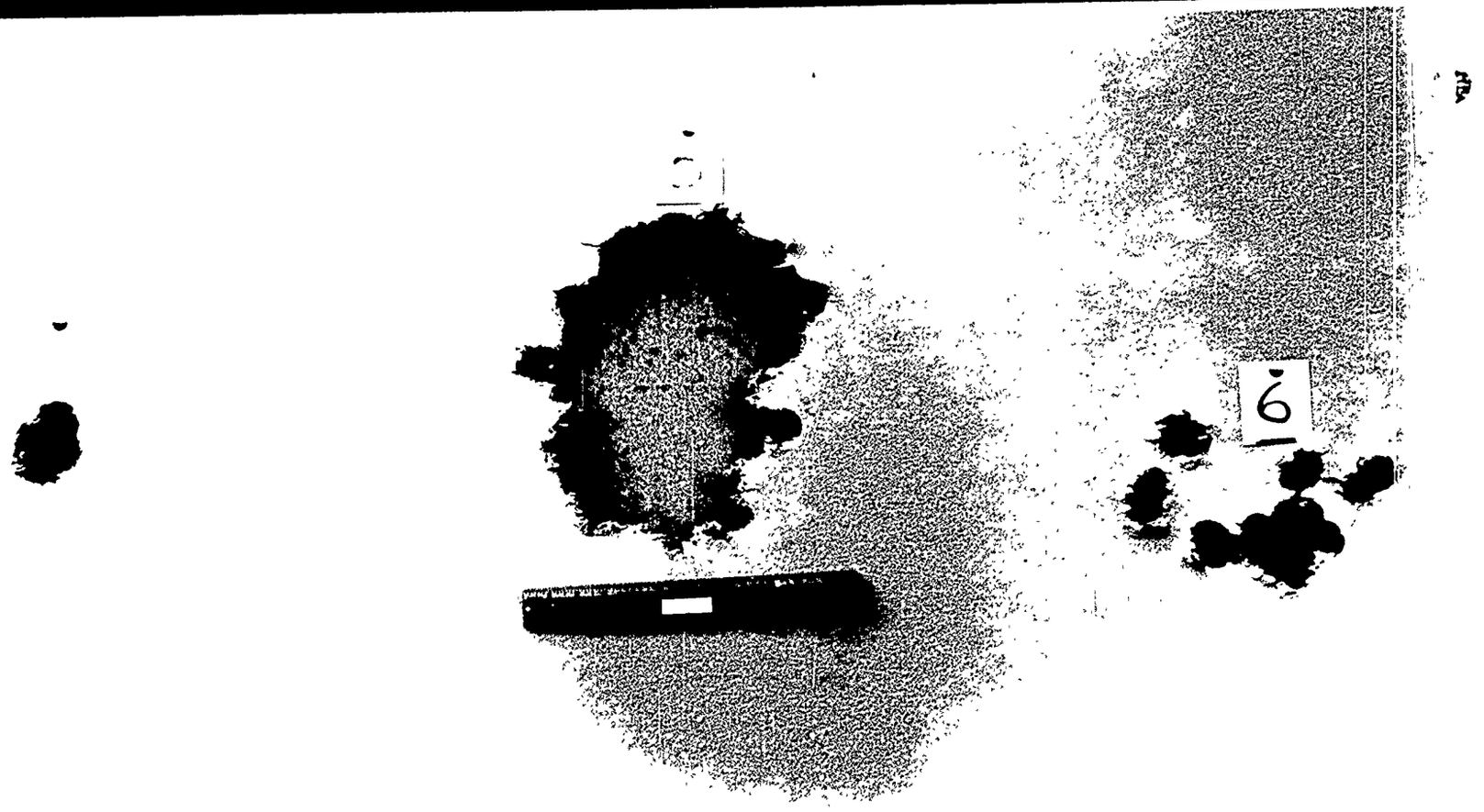
APPENDIX D

CONFIDENTIAL
SECURITY INFORMATION

NP9-48993 2 April 1951

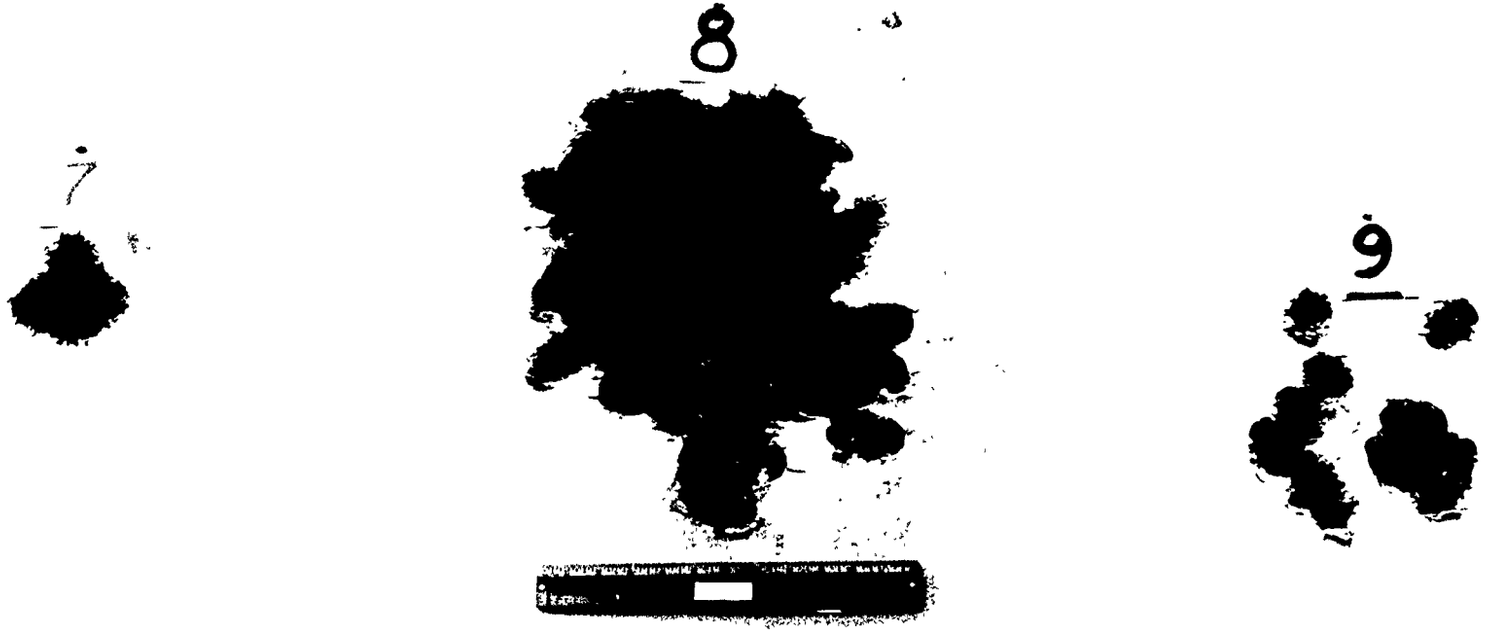
40MM Gun Barrel, Type A Mod. 14, Serial No. 17, Figure 4 - 11 Rounds Cold Erosion Test, Figure 5 - 19 - 8 Round Bursts, Figure 6 - 10 Rounds Hot Erosion Test, Total No. Rounds on Barrel - 1388

Figures 4, 5 and 6 APPENDIX D



40MM Gun Barrel, Type A Mod. 14, Serial No. 17, Figure 7 - 11 Rounds Cold Erosion Test, Figure 8 - 19 - 8 Round Bursts Plus 14 Rounds, Figure 9 - 10 Rounds Hot Erosion Test, Total No. Rounds on Barrel - 1575

Figures 7, 8 and 9 APPENDIX D

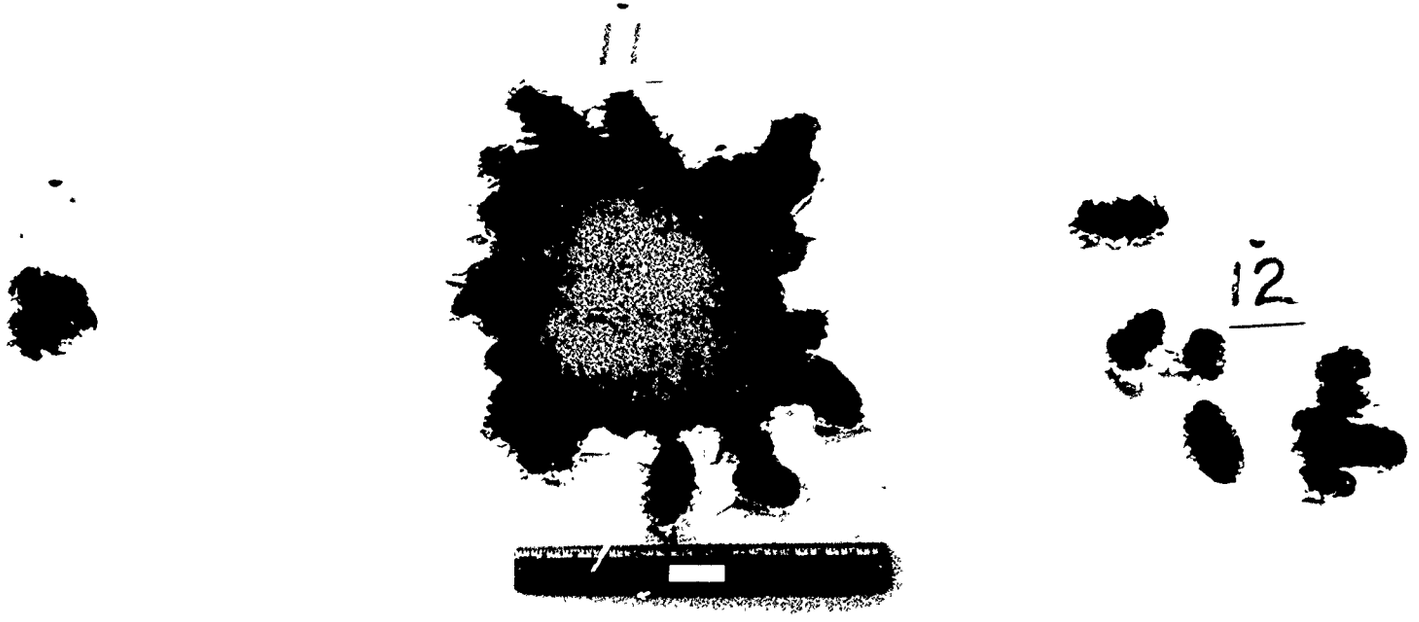


CONFIDENTIAL
SECURITY INFORMATION

NP9-48995 3 April 1951

40MM Gun Barrel, Type A Mod. 14, Serial No. 17, Figure 10 - 11 Rounds Cold Erosion Test, Figure 11 - 19 - [illegible] Round Bursts, Figure 12 - 10 Rounds Hot erosion Test,. Total No. Rounds on Barrel - 1748

Figures 10, 11 and 12 APPENDIX D

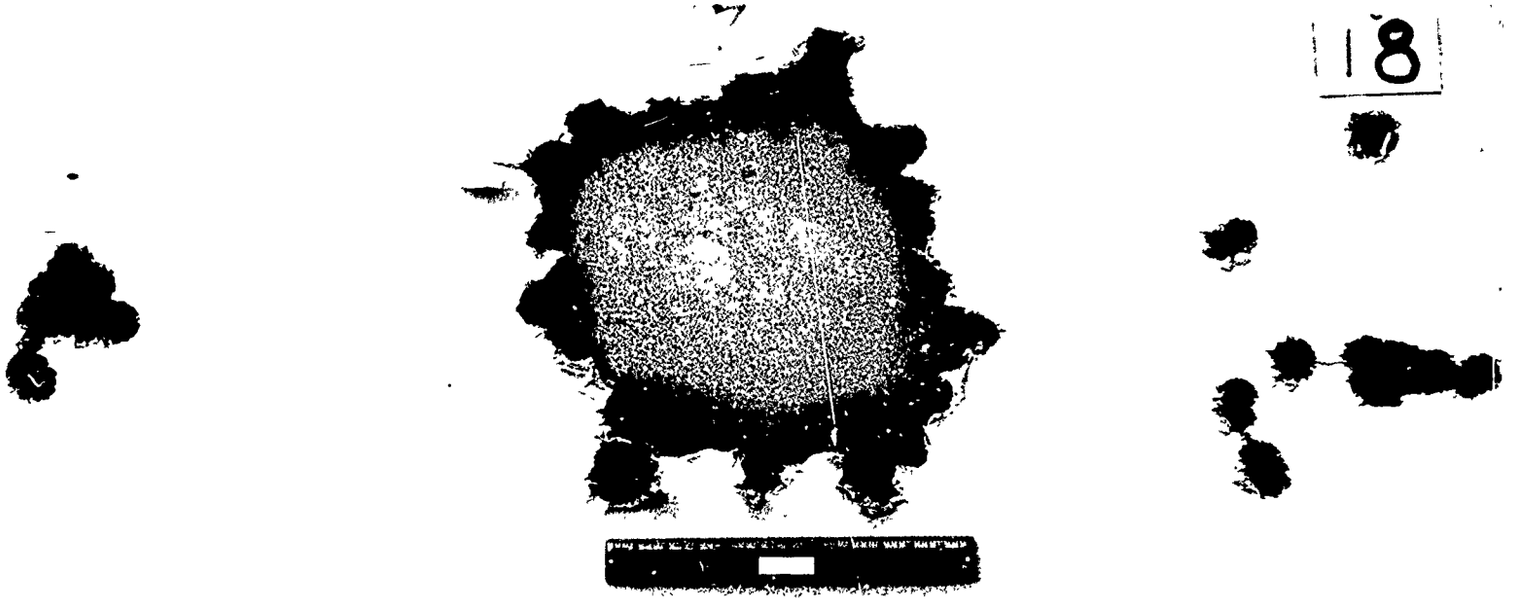


40MM Gun Barrel, Type A Mod. 14, Serial No. 17, Figure 13 - 11 Rounds Cold Erosion Test, Figure 14 - 19 - 8 Round Bursts, Figure 15 - 10 Rounds Hot Erosion Test, Total No. Rounds on Barrel - 1921

Figures 13, 14 and 15 APPENDIX D

NP9-48997 4 April 1951 CONFIDENTIAL
SECURITY INFORMATION
40MM Gun Barrel, Type A Mod. 14, Serial No. 17, Figure 16 - 11 Rounds Cold Erosion Test, Figure 17 - 19 - 8 Round Bursts, Figure 18 - 10 Rounds Hot Erosion Test, Total No. Rounds on Barrel - 2094

Figures 16, 17 and 18 APPENDIX D



NP9-48998 5 April 1951 SECURITY INFORMATION
40MM Gun Barrel; Type A Mod. 14, Serial No. 17, Figure 19 - 11 Rounds Cold Erosion Test,
Total No. Rounds on Barrel - 2105
Figure 19 APPENDIX D

[redacted]

NPG REPORT NO. 982

Inspection, Proof and Firing Tests of
40mm Gun Barrel Type A Mod. 14 Serial No. 17
(Molybdenum Liner - Westinghouse No. BL 338)

DISTRIBUTION

Bureau of Ordnance	
Ad3	1
Re5	1
Re5a	1
Re5d	1
Navy Research Section, Library of Congress, Washington 25, D. C. (Via BUORD Re5)	2
Chief of Ordnance, Department of the Army Attn: ORDTX-AR	2
Commanding General Aberdeen Proving Ground Aberdeen, Maryland Attn: Technical Information Section Development and Proof Services	1
Naval Gun Factory	1
Watertown Arsenal Watertown, Mass.	1
Solid Propellant Information Agency APL/JHU, Silver Spring, Maryland	1
Catholic University of America Washington, D. C. Attn: Dr. F. O. Rice	1
Local: OMG	1
OMG Files	1
File	1

[redacted]

APPENDIX E

[redacted]

NPG REPORT NO. 982

Inspection, Proof and Firing Tests of
40mm Gun Barrel Type A Mod. 14 Serial No. 17
(Molybdenum Liner - Westinghouse No. BL 338)

PART A

SYNOPSIS

1. This is the twenty-first partial report on Task Assignment NPG-13-Re5a-27-1-52. Development of Molybdenum Gun Liners.

2. This report covers the second and third series of firing tests of 40mm barrel Type A Mod. 14 Serial No. 17 with short molybdenum liner (Westinghouse No. BL 338). The liner was of "lined worm" construction consisting of 33 segments. The second segment which begins at about 12"125 from the breech face is made from one piece of molybdenum without the supporting steel ring. The molybdenum rings contained 0.2% cobalt and were forged discs having marked improvement in mechanical properties over previous molybdenum liners. Two radial holes for observation of liner movement had been drilled and plugged at about 14"2 and 23"12 from the breech face. The contractor had noted a slight over-size condition in the muzzle section bore.

3. The purpose of this test was to determine whether or not the subject barrel could withstand extended rapid-fire bursts using a hot propellant.

4. a. After 1037 rounds, of which 912 were fired with a hot propellant, firing was halted due to excessive dispersion of the range pattern. The barrel was sent to the Naval Gun Factory for inspection and photographing. It was returned to the contractor to be fitted with a new muzzle section.

b. After a cumulative total of 2105 rounds, of which 1838 were fired with a hot propellant, firing was halted due to excessive dispersion of the range pattern. It was returned to the contractor for fitting of a new muzzle section.

c. After a cumulative total of 2804 rounds, of which 2406 were fired with a hot propellant, firing was halted due to excessive dispersion of the range pattern.

5. As a result of these tests it was concluded:

a. 40mm gun barrel Type A Mod. 14 Serial No. 17 with short Molybdenum liner (Westinghouse No. BL 338) with two additional muzzle sections, when firing hot propellant rounds in rapid-fire bursts, failed due to tumbling of projectile in flight and loss of accuracy.

[redacted]

[redacted]

NPG REPORT NO. 982

Inspection, Proof and Firing Tests of
40mm Gun Barrel Type A Mod. 14 Serial No. 17
(Molybdenum Liner - Westinghouse No. BL 338)

TABLE OF CONTENTS

[redacted]

Inspection, Proof and Firing Tests of
40mm Gun Barrel Type A Mod. 14 Serial No. 17
(Molybdenum Liner - Westinghouse No. BL 338)

PART B

INTRODUCTION

1. AUTHORITY:

Tests reported herein were authorized by reference (a).

2. REFERENCES:

a. BUORD Conf ltr NOrd 10276 Ser 16265(Re5a-JHP:cmj of 23 January 1951
b. BUORD Conf ltr NOrd 9633(Re5a-27) of 3 September 1946
c. NPG Report No. 7-47 of December 1947
d. COM NAVPROV Conf ltr S74-1(14)(MG80051) of 3 March 1948
e. NPG Report No. 103 of 17 September 1948
f. NPG Report No. 119 of 5 October 1948
g. NPG Report No. 162 of 2 December 1948
h. NPG Report No. 192 of 5 January 1949
i. NPG Report No. 197 of 13 January 1949
j. NPG Report No. 377 of 20 September 1949
k. NPG Report No. 404 of 28 October 1949
l. NPG Report No. 462 of 16 January 1950
m. NPG Report No. 506 of 2 March 1950
n. NPG Report No. 528 of 24 March 1950
o. NPG Report No. 529 of 10 May 1950
p. NPG Report No. 575 of 12 June 1950
q. NPG Report No. 648 of 22 September 1950
r. NPG Report No. 679 of 16 November 1950
s. NPG Report No. 709 of 23 January 1951
t. NPG Report No. 765 of 14 April 1951

3. BACKGROUND:

Reference (b) established Task Assignment NPG-13-Re5a-27-1 to determine the suitability of molybdenum gun liners for gun barrels having requirements of increased muzzle velocities, higher rates of fire, and increased length of bursts. This material is believed suitable because of the high resistance of molybdenum and some of its alloys to erosion at high temperatures. The development of these liners for the 40mm (Army M1) gun barrels is an intermediate step in the development of similar liners for larger barrels. References (c) through (t) are Naval Proving Ground Reports on previous tests of molybdenum lined 40mm M1 gun barrels.

Inspection, Proof and Firing Tests of
40mm Gun Barrel Type A Mod. 14 Serial No. 17
(Molybdenum Liner - Westinghouse No. BL 338)

4. OBJECT OF TEST:

The firing was conducted to life test the 40mm gun barrel Type A Mod. 14 Serial No. 17 with short molybdenum liner and fitted with two new muzzle sections. The new muzzle sections were fitted after 1037 and 2105 rounds.

5. PERIOD OF TEST:

a.	Date of Project Letter	23 January 1951
b.	Date Necessary Material Received	26 January 1951
c.	Date Commenced Test	29 January 1951
d.	Date Completed Test	10 June 1951

6. REPRESENTATIVES PRESENT:

The following persons were present at intervals during the test.

J. H. Portch	Bureau of Ordnance
W. Keat	Naval Gun Factory
F. W. Weathersbee	Bureau of Ordnance

PART C

DETAILS OF TEST

7. DESCRIPTION OF ITEM UNDER TEST:

a. The test vehicle was a 40mm gun barrel Type A Mod. 14 Serial No. 17 with short molybdenum liner No. BL 338, fitted with two new muzzle sections, manufactured by the Westinghouse Electric Corporation.

b. The construction of the subject barrel was similar to that of No. 16 reported by reference (r) with the following exceptions:

(1) The second segment which begins at about 12$\frac{1}{2}$125 from breech face was made of one piece of molybdenum without the supporting steel ring.

(2) Two radial holes for observation of liner movement had been drilled and plugged at about 14$\frac{1}{2}$12 and 23$\frac{1}{2}$12 from the breech face.

8. DESCRIPTION OF TEST EQUIPMENT:

a. Maximum Chamber Pressure

The maximum pressures of the proof sequence and erosion check rounds were obtained by the use of standard copper crusher gauges.

b. Velocities of magnetized projectiles fired in this test were obtained by means of spaced solenoids and recording equipment.

c. Star gauge measurements were taken prior to any firing, after 1037, 1388, 1748, 2105, 2458 and 2804 rounds, by two standard 40mm star gauges Mark 2 Mod. One was equipped for land measurements and the other was equipped for groove measurements.

d. Plug (erosion) gauge measurements were taken at the same time the bore was star gauged. A standard 40mm Plug (erosion) Gauge with a diameter of 1.1618 was used.

9. PROCEDURE:

a. A proof series composed of one service, two proof, and one service round was fired.

b. The following Standard Firing Series was repeated until the performance of the barrel became unsatisfactory.

(1) One or more velocity check rounds consisting of fixed service ammunition using SPDN 8541, charge weight 305.3 grams, Projectile Mk 2 Weight 1.987 lbs.

(2) A cold erosion check consisting of 10 rounds slow fire with standard powder SPDN 8541, charge weight 305.3 grams, Projectiles Mk 2 Weight 1.987 lbs. Chamber pressures and velocities were recorded.

(3) A series of nineteen 8-round bursts with intervals of approximately 11 seconds between bursts. Each round consisted of a powder charge of 312 grams of Army hot powder (M5 Lot SUN 14212) and projectiles Mk 2, Weight 1.987 lbs. Velocities on the first four rounds of each burst were recorded.

c. The standard firing series outlined in sub-paragraph (b) above were completed 6 times.

d. (1) After the sixth standard firing series, (see NPG Report No. 765) the barrel was sent to the Naval Gun Factory for inspection and bore photographs and subsequently returned to the contractor to be fitted with a new muzzle section. Total rounds 2105.

(2) After the seventeenth standard firing series the barrel was sent to the Naval Gun Factory for inspection and bore photographs and subsequently returned to the contractor to be sectioned and examined.

e. Visual examination by borescope was made after each Standard Firing Series.

10. RESULTS AND DISCUSSION:

a. Tables I through V, Appendix (A) are star gauge readings taken at intervals during the firing tests. Tables VI through X, Appendix (B) are tabulated chamber pressures obtained from the erosion check rounds and velocities taken during the firing tests. Table XI of Appendix (C) is a tabulation of the results of the visual boresearch examinations taken after each standard firing series. Figures 1 through 19 of Appendix (D) are photographs of Yaw Cards.

b. Observation of the yaw cards during firings showed that several projectiles were tipping. These yaw cards also show how the range pattern would open during the final firing series.

c. The plug erosion gauge reading after 2105 rounds was 12.648, after 2804 rounds was 12.725.

d. 40mm Gun Barrel Type A Mod. 14 Serial No. 17 is not to be fired further. Will be returned to the contractor to be sectioned and examined.

Inspection, Proof and Firing Tests of
40mm Gun Barrel Type A Mod. 14 Serial No. 17
(Molybdenum Liner - Westinghouse No. BL 338)

UNCLASSIFIED

PART D

CONCLUSIONS

11. From the results of the subject test it was concluded that:

a. 40mm gun barrel Type A Mod. 14 Serial No. 17 with short Molybdenum Liner (Westinghouse No. BL 338), and two additional muzzle sections, failed due to tumbling of projectiles in flight and loss of accuracy.

The tests upon which this report is based were conducted by:
C. D. BERRY, Lieutenant, USN
Machine Gun Division Firing and Project Officer,
Armament Department

This report was prepared by:
C. D. BERRY, Lieutenant, USN
Machine Gun Division Firing and Project Officer,
Armament Department

This report was reviewed by:
D. A. DICKSON, Lieutenant Commander, USN
Machine Gun Division Officer
Armament Department
L. C. KLINGAMAN, Commander, USN
Armament Officer
Armament Department

APPROVED: JOHN A. EDWARDS
Captain, USN
Commander, Naval Proving Ground
Acting

C. T. MAURO
Captain, USN
Ordnance Officer
By direction

UNCLASSIFIED